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NOTES ON GEOGRAPHIC DISTRIBUTION

Pisces, Gymnotiformes, Hypopomidae, *Brachyhypopomus* Mago-Leccia, 1994: First country record of three species of the genus, Argentina

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ABSTRACT: *Brachyhypopomus bombilla*, *B. draco* and *B. gauderio* are recorded for the first time in freshwaters of Argentina. These species were collected in the Río Paraná basin at the Iberá Wetlands and Pre-Delta National Park. *Brachyhypopomus bombilla*, *B. draco* and *B. gauderio* can be sympatric and syntopic in Pre-Delta National Park, whereas *B. bombilla* and *B. gauderio* occupy the same environments in the Iberá Wetlands. Some records of *B. brevirostris* for Argentina are misidentifications of *B. gauderio*, whereas others could correspond to one of these three species.

The genus *Brachyhypopomus*, erected by Mago-Leccia (1994), has a broad distribution ranging from Costa Rica to the Río de la Plata Basin in Argentina. At present, this genus includes eleven species: *B. beebei* (Schultz, 1944), *B. bombilla* Loureiro and Silva, 2006, *B. brevirostris* (Steindachner, 1868), *B. bullocki* Sullivan and Hopkins, 2009, *B. diazi* (Fernández-Yépez, 1972), *B. draco* Giora, Malabarba and Crampton, 2008, *B. gauderio* Giora and Malabarba, 2009, *B. janeiroensis* (Costa and Campos-da-Paz, 1992), *B. jureiae* Triques and Khamis, 2003, *B. occidentalis* (Regan, 1914), and *B. pinnicaudatus* (Hopkins, 1991).

In Argentina, only *B. brevirostris* has been widely recordered from the Ríos Paraná, Uruguay, and Paraguay Basins (Ringuelet *et al*. 1967; Bonetto *et al*. 1978; 1981; Fernandez Santos *et al*. 1982; Liotta *et al*. 1995/96). However, recent collecting trips to the Río Paraná Basin have yielded new records for three *Brachyhypopomus* species.

The goal of this paper is to report the presence of *B. bombilla, B. draco* and *B. gauderio* in freshwaters of Argentina (Figure 1).

Morphometric and meristic data were taken following Giora *et al.* (2008). Body length was measured as the distance from the tip of the snout to the posterior end of the anal-fin base (LEA).

Brachyhypopomus bombilla Loureiro and Silva, 2006 (Figure 2).

Morphometric and meristic data are given in Table 1. This species is easily distinguished by its distinctive color pattern of body consisting of scattered dark brown pigmentation over a brown background, 155-190 anal-fin rays, body depth (9.2-10.9 % of LEA), interorbital distance (16.6-33.0 % of HL), branchial opening (14.3-25.0 % of HL), upper jaw slightly longer than lower jaw, (Loureiro and Silva 2006), depth of caudal filament ranging between 1.5-2.0 % of LEA (material examined herein).

Habitat and distribution: The specimens of *Brachyhypopomus bombilla* were collected in the Río Paraná Basin (Figure 1). Individuals were caught from among the submerged vegetation in the coastal areas of Laguna Galarza (Figure 3), and Río Corriente, both localities in the Iberá Wetlands, Corrientes province. The main characteristics of these habitats are provided in Table 2. This species was also found in the Arroyo Las Mangas, in Pre-Delta National Park, located on the left margin of the lower course of the Río Paraná, Entre Ríos province (Figure 4).

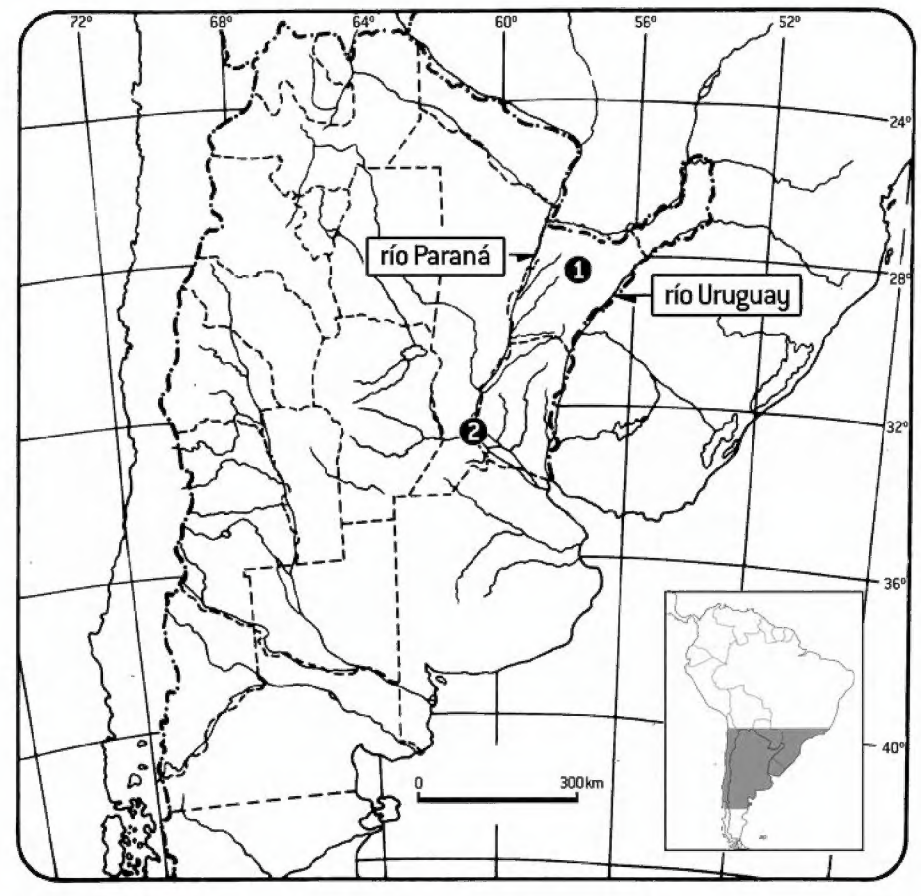

FIGURE 1. Geographical distribution of *Brachyhypopomus bombilla*, *B. draco*, and *B. gauderio*. 1. Iberá Wetlands, 2. Pre-Delta National Park.

FIGURE 2. *Brachyhypopomus bombilla*, MACN ict 9458, 64.5 mm LEA, Arroyo Las Mangas, Pre-Delta National Park, Entre Ríos province, Argentina.

FIGURE 3. Laguna Galarza, Esteros del Iberá Wetlands, Corrientes province, Argentina.

FIGURE 4. Arroyo Las Mangas, Pre-Delta National Park, Entre Ríos province, Argentina.

FIGURE 5. *Brachyhypopomus draco*, AI 268, male, 128.8 mm LEA, Arroyo Las Tortugas, Pre-Delta National Park, Entre Ríos province, Argentina.

Material examined: All material comes from the Río Paraná basin. *Brachyhypopomus bombilla*: AI 267, 10 exs., 90.9-131.5 mm LEA, Corrientes province, Esteros del Iberá, Laguna Galarza (28°04'56" S, 56°42'04" W). MACN ict 9457, 2 exs., 90.7-96.4 mm LEA, Corrientes province, Iberá Wetlands, Río Corriente (28°42'45" S, 58°06'40" W). MACN ict 9458, 1 ex., 64.5 mm LEA, Entre Ríos province, Pre-Delta Nacional Park, Arroyo Las Mangas (32°07'58.7" S, 60°39'36.9" W).

Brachyhypopomus draco Giora, Malabarba and Crampton, 2008, (Figure 5).

Morphometric and meristic data are given in Table 1. This species is distinguished by the shape of the distal portion of the caudal filament, which is a distinct paddle shape structure in mature males. General body color brownish with variable number of brown bands perpendicular or oblique to craniocaudal body axis, upper jaw as long as lower jaw, 155-198 anal-fin rays, body depth (8.8-12.2 % of LEA), interorbital distance (22.7-35.0 % of HL), branchial opening (16.5-26.0 % of HL), and depth of caudal filament (1.4-3.1 % of LEA) (Giora *et al*. 2008).

The single male specimen examined herein was collected during the spawning season (October); however, the distal portion of its caudal filament was not as expanded as illustrated in the original description (Giora *et al*. 2008; Figures 1 and 2).

Distribution: *Brachyhypopomus draco* was collected from the Arroyo Las Tortugas, Pozo Hondo, at Pre-Delta National Park, Entre Ríos province (Figures 1 and 6)

Material examined: *Brachyhypopomus draco*: All material comes from the Río Paraná Basin. AI 268, 2 exs., 117.7-128.8 mm LEA, Entre Ríos province, Pre-Delta Matinal Park, Pozo Hondo, Arroyo Las Tortugas (32°08'40.3" S, 60°39'02.2" W).

FIGURE 6. Arroyo Las Tortugas, Pozo Hondo, Pre-Delta National Park, Entre Ríos province, Argentina.

Brachyhypopomus gauderio Giora and Malabarba, 2009 (Figure 7).

Morphometric and meristic data are given in Table 1. This species is characterized by its color pattern that varies from light brown to yellow. Dorsal surface with chocolate-brown irregular spots connected to form reticulated pattern, 180-216 anal-fin rays, upper jaw as long as lower jaw, body depth (11.0-14.1 % of LEA), interorbital distance

(23.3-30.4 % of HL), branchial opening (20.4-28.1 % of HL), depth of caudal filament (1.6-2.4 % of LEA), and caudal filament of mature males laterally compressed (Giora and Malabarba 2009).

The specimens examined herein presented some differences in interorbital distance with respect to the values provided in the original description (22.0-26.0 vs. 23.3-30.4 % of HL).

TABLE 1. Morphometric data for *Brachyhypopomus bombilla* (n=12), *B. draco* (n=2) and *B. gauderio* (n=9). Length to tip of anal fin (LEA); standard deviation (SD).

	B. bombilla			*B. draco*		*B. gauderio*		
	Range	**Mean**	**SD**	**Female**	**Male**	**Range**	**Mean**	**SD**
LEA (mm)	90.7 - 131.5			117.7	128.8	108.7-133.9		
Percentage of LEA								
Head length (HL)	11.0 – 12.8	12.0	0.56	11.0	10.2	10.1-11.8	11.0	0.53
Caudal filament length	17.4 – 26.0	22.0	2.48	21.3	25.9	21.5 – 33.3	26.9	4.42
Snout to anal fin origin	19.5 – 21.5	20.3	0.73	19.8	17.7	17.1 -20.2	18.8	1.21
Depth of caudal filament	1.5 – 2.0	1.8	0.17	2.6	2.4	2.0 – 2.4	2.2	0.15
Longest anal fin ray	3.4 – 3.9	3.7	0.16	3.7	3.8	3.6 – 4.4	4.1	0.27
Longest pectoral fin ray	5.4 – 6.7	6.1	0.41	4.8	5.4	5.3 – 6.7	6.1	0.52
Anal-fin length	70.0 – 80.6	78.1	3.17	80.1	81.5	80.3 – 84.8	8/2.4	1.72
Body depth	10.5 – 11.7	11.0	0.45	10.3	10.8	10.9 – 14.8	13.1	1.46
Body width	6.1 – 7.1	6.6	0.37	5.9	6.4	5.8 – 8.2	7.2	1.03
Percentage of HL								
Snout length	28.5 – 32.7	30.3	1.28	30.2	29.0	26.8 – 30.4	28.9	1.19
Gape width	18.4 – 24.1	21.2	1.74	14.7	17.6	17.7 – 18.8	18.4	0.43
Orbital diameter	11.8 – 14.7	13.5	0.92	12.4	13.3	10.1 – 12.6	11.7	0.90
Interorbital distance	16.0 – 20.1	18.4	1.43	27.9	32.8	22.0 – 26.0	23.9	1.68
Posterior nare to eye	7.4 – 8.8	7.8	0.41	4.7	5.3	5.0 – 6.6	5.8	0.51
Branchial aperture	18.4 – 23.3	20.9	1.49	24.8	26.7	24.4 – 28.5	26.8	1.51
Head width at operculum	53.2 – 64.5	58.3	2.96	64.3	65.6	60.6 – 67.0	64.1	2.34
Head width at eyes	37.3 – 42.6	39.8	1.88	45.7	45.8	44.0 – 49.0	47.3	1.45
Anal-fin rays	162 – 193			183	181	180 – 195		
Pectoral-fin rays	15 – 17			16	17	15 – 17		

TABLE 2. Some enviromental variables recorded at the two sampling sites inhabited by *Brachyhypopomus bombilla* and *B. gauderio*.

	Laguna Galarza	**Río Corriente**
Water temperature (ºC)	14.5-33.3	15.8-26.2
Depth (m)	1.8	1.5
Secchi disk transparency (cm)	34-bottom	bottom
Turbidity (NTU)	2.1-8.6	3.2-8.3
Conductivity (µS/cm)	12.5-29.7	34.7-230.0
pH	4.8-6.4	5.3-6.8
Disolved oxygen (mg/L)	3.5-9.5	5.6-8.2
D. O. (% saturation)	39.2-101.9	66.9-98.2
Alcalinity (mg/L)	1.0-16.0	9.0-12.0
Hardness (mg/L)	2.0-17.0	8.0-24.0
Chlorides (mg/L)	0.8-4.4	3.6-38.4
Nitrates (mg/L)	< 3	< 3
Phosphates (mg/L)	< 0.01	< 0.01

FIGURE 7. *Brachyhypopomus gauderio*, MACN ict 9460, 91.5 mm of LEA, Arroyo Los Dorados, Pre-Delta National Park, Entre Ríos province. Argentina.

Habitat and distribution: *Brachyhypopomus gauderio* was collected from many localities in the Iberá Wetlands (Figure 1) (Lagunas Iberá, Galarza (Figure 3), Luna, Paraná and San Juan, and Río Corriente), Corrientes province, and in Arroyo Los Dorados in Pre-Delta National Park, Entre Ríos province (Figures 1 and 8).

Material examined: All material comes from the Río Paraná Basin. *Brachyhypopomus gauderio*: MACN ict 9459, 9 exs., 108.7-133.9 mm LEA, Corrientes province, Iberá Wetlands, Laguna Galarza (28°04'56" S, 56°42'04" W). MACN ict 9460 1 ex., 91.5 mm of LEA, Entre Ríos province, Pre-Delta Nacional Park, Arroyo Los Dorados (32°08'08.8" S, 60°37'26.2" W).

Brachypopomus brevirostris, originally described from the Río Guapore in Amazonia, is the only species of the genus frecuently recorded in freshwaters of Argentina. This species is distinguished from *B. bombilla*, *B. draco*, and *B. gauderio* by the greater length of its caudal filament (45 % of LEA [Giora and Malabarba 2009] vs. 17.4-26.0; 21.3-25.9, and 21.5-33.3 respectively), and higher number of anal fin rays (251-259 [Giora and Malabarba 2009] vs. 162-193, 181-183, and 173-195 respectively). In addition, the possession of an upper jaw slightly longer than the lower jaw distinguishes *B. brevirostris* from *B. draco* and *B. gauderio*.

The specimens identified as *Brachyhypopomus brevirostris* in Casciotta *et al.* (2005, Figure 108) and Almirón *et al.* (2008: 173) correspond to *B. gauderio*. It is possible that some other Argentinian records of this

species could correspond to *B. bombilla*, *B. draco* or *B. gauderio*.

As noted by Giora and Malabarba (2009), *B. bombilla*, *B. draco* and *B. gauderio* can be sympatric and syntopic. In the Pre-Delta National Park both conditions are true for the three species. On the other hand, *B. bombilla* and *B. gauderio* share the same enviroment with abundant floating vegetation in the Iberá Wetlands.

Figure 8. Arroyo Los Dorados, Pre-Delta National Park, Entre Ríos province, Argentina.

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